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Development of ASIC for Si/CdTe detectors in radioactive substance visualizing system

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We report on the recent development of a 64-channel analog front-end ASIC for a new gamma-ray imaging system to visualize radioactive substances. The imaging system employs a novel Compton camera which consists of silicon and cadmium telluride (CdTe) detectors. The ASIC aims for the readout of pixel /pad detectors utilizing Si/CdTe as detector materials, and the dynamic range from 100 keV to a few MeV. The readout chip consists of 64 identical signal channels and was implemented with the X-FAB 0.35 um CMOS technology. Each channel contains a charge-sensitive amplifier, pole-zero cancellation circuit, low-pass filter, comparator, and sample-hold circuit together with a Wilkinson-type A-to-D converter. We observed an equivalent noise charge of ˜ 500 e- and a noise slope of ˜5 e-/pF. We also report on the performance test when connected to Schottky CdTe diodes.

Primary author: HARAYAMA, Atsushi (Japan Aerospace Exploration Agency)

Co-authors: Dr SATO, Goro (Japan Aerospace Exploration Agency); Prof. IKEDA, Hirokazu (Japan Aerospace Exploration Agency); Dr WATANABE, Shin (Japan Aerospace Exploration Agency); Dr TAKEDA, Shin'ichiro (Japan Aerospace Exploration Agency); Prof. TAKAHASHI, Tadayuki (Japan Aerospace Exploration Agency)

Presenter: HARAYAMA, Atsushi (Japan Aerospace Exploration Agency)

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